period-luminosity

Henrietta Leavitt

Photo courtesy of the AAVSO

Period-Luminosity

Henrietta Leavitt was one of the female pioneers in astronomy, credited for the discovery of the cepheid variable period-luminosity. Born in 1868, she studied astronomy in school but took a hiatus from the field due to a serious illness that left her deaf. Her love for all things celestial eventually earned her a position at Harvard College Observatory.

While cataloguing variable stars (stars that change from bright to dim and back), Henrietta discovered the relation between the period and luminosity of classical cepheid variable stars. This period-luminosity relation gauged measurements of the distances of stars from the earth and the determination of intergalactic distances by determining the distances of stars in other galaxies from earth. She also made a direct correlation between a star's magnitude (degree of brightness) and the length of time it is most luminous. In other words, the brighter the star is overall, the longer the period of luminosity.

In 1912, Leavitt published a chart of 25 cepheid periods and their apparent brightness. Using this, astronomers only needed to know the period of a cepheid variable to figure out its level of brightness, and therefore how far away it was. With Leavitt's findings, distances of cepheids could be determined up to 10 million light years. Prior to her discovery, methods for measuring distances in space only went back about 100 light years. Although she died in 1921 before receiving a Nobel Prize, her discoveries paved the way for new discoveries and were used for many years after her death.

Astronomy: Cepheid variables are of interest to astronomers mostly because:
W) they are sources of intense neutron radiation
X) they are rare binary eclipsing systems
Y) they are distance indicators
Z) they are unpredictable in their brightness

Answer: Y) they are distance indicators

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4 Henrietta Leavitt's Birthday; Independence Day	5	6	7
8	9 Martyrdom of the Bab (Baha'i Holiday)	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27 Bernoulli's Birthday	28
29	30	31				

$$M_v = -2.76\log(P) - 1.4$$

June 2007

S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

August 2007

S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

july 2007